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TREATMENT OF SPINAL AFFECTIONS.

BY

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ON PROFESSOR SAYRE'S TREATMENT OF SPINAL AFFECTIONS.*

It will be within the memory of most of the members of the Birmingham and Midland Counties Branch of the British Medical Association, that Dr. Sayre, of New York, gave, at my invitation, a demonstration of his plan of treating spinal curvature, in the theatre of the Queen's Hospital, in July, 1877, that many of the surgeons of the Birmingham Hospitals, and general practitioners, were present on the occasion, and kindly furnished cases suitable for the application of his plaster jackets; that Dr. Sayre selected two cases of lateral and one of angular curvature, for the purpose of illustration, and while showing us how to apply the plaster bandages, also gave a graphic and lucid description of the principles on which his practice was founded. Most of us were favourably impressed by Dr. Sayre's earnest and persuasive lecture, and many determined to put his plan of treatment into practice, whenever a suitable occasion presented itself.

Unfortunately, spinal caries and spinal curvature are so common in this town and district, that frequent opportunities of employing Dr. Sayre's plan have presented themselves, and it may be well for us now, after the lapse of two years, to compare notes as to our respective experience; to say whether we have found the help and advantage from it that we were led to anticipate, and if the general verdict is in its favour, by our united voices to encourage the more extended adoption of Sayre's

* A paper read at the Birmingham and Midland Counties Branch of the British Medical Association, on December 11th, 1879.

method, and so give to the inventor that moral support which will be his best reward for his zealous labours in this department of the surgical art. For my own part, I may say that the greater my experience of Professor Sayre's plan of treatment, the more satisfied I am that it is of the greatest utility, and that the profession owe him their best thanks for his introduction and strenuous advocacy of this method of practice. I will, with your permission, first read some of the statements in favour of his plan, which Dr. Sayre enumerated.

1. He attested that Pott's disease was nearly always due to a traumatic cause, and that the old idea that it was essentially a disease of a strumous or tubercular character was erroneous.

2. That it was necessary to watch very carefully for the early symptoms of spinal disease, which he described at some length, and to form an accurate diagnosis from them.

3. That the plans of treatment formerly adopted, whether by protracted rest in bed, or by mechanical supports, were useless if not injurious, and that real rest and fixity of the diseased parts could best be obtained with extension by means of his tripod and pulleys, and by the application of a plaster of Paris jacket to the entire trunk, while the patient's body was in a state of extension.

4. That such jackets could be borne with comfort for months; that patients wearing them were able to breathe more freely, and that being able to take exercise in the open air, they soon regained strength.

5. That by their instrumentality the local disease of the spine was relieved, the risk of psoas or lumbar abscess greatly diminished, and the deformity ordinarily resulting from angular curvature reduced considerably.

Now what answer can be given to these propositions after two years' experience of them? My reply is that the views of Dr. Sayre have been fully confirmed.

1. The traumatic causation of Pott's disease is now generally admitted.

2. The importance of the early discovery of symptoms of spinal irritation and their special significance as determining what part of the vertebral column is begining to be affected, will be acknowledged by all.

3. The adoption of Dr. Sayre's plan of treating such cases by extension and the plaster jacket has been very general in this country, and though other methods have been suggested having the same idea of rest and fixation of the spine in view, Dr. Sayre's principles are those which all succeeding surgeons have followed to a greater or less degree.

4. The prolonged wearing of the plaster jacket has been shown not only to be free from risk and inconvenience, but under its use very many patients have either been cured or greatly relieved.

5. Psoas and lumbar abscess have been less frequent since the adoption of Dr. Sayre's plan, and when they have occurred, if treated antiseptically through a window in the plaster jacket, they have given but little trouble and have often ceased to discharge.

The general health of patients has greatly improved under the lengthened wearing of the plaster jacket, and the amount of deformity incident to the falling in of the bodies of the vertebræ, has been sensibly diminished.

Such in my opinion are the advantages of Dr. Sayre's plan of treating spinal disease after a trial of it in upwards of one hundred cases. I will not occupy your time in giving details of them. Most of my cases have been at the Queen's Hospital, and my house surgeons, dressers,

and pupils can testify to the good results obtained. I will, however, call your attention to certain special points to be attended to in the application of the plaster jacket, which occur to me as most noteworthy.

1. Never over extend the spine—a crooked spine which has been so fixed by bony anchylosis cannot be made straight, and no attempt should be made to straighten it.

2. The use of the special pulley made by Salt & Son, of Birmingham, after Weston's block, and which I am able to produce before you, enables us to limit accurately the amount of extension, and to release the patient instantaneously should we require to do so.

3. When a patient is being suspended, we should always have some competent person, a surgeon if possible, in front of him, to see that he is not taken completely off his legs, or allowed to swing round, so as to run the risk of strangulation ; this person's duty is also to give warning, in order that the patient may be lowered immediately, if symptoms of syncope appear.

4. To have good fresh plaster of Paris ; an abundance of narrow perforated tin strips, to strengthen the jacket in any direction that may be thought desirable.

5. To let the patient have a good meal immediately before the use of the jacket, and not to be merely satisfied with a dinner pad.

6. To pad well with cotton wool over the iliac spines, and also on either side of the angular projection of the spine, so that no undue pressure on the hump itself shall take place.

7. To open and dress antiseptically any abscess that may form either in the groin or loin. An instance of the good effect of this in a case of my own is quoted by Dr. Sayre, in his work on Spinal Disease and Spinal Curvature, p. 89.

8. To mark the site of the abscess by a carpet pin, the point of which projects through a piece of card board, and also the various layers of superimposed bandage.

9. Lastly, it should be a rule never to cut open the case when the disease is in the dorsal region ; our object being that the breathing be kept entirely diaphragmatic and abdominal, rather than thoracic ; and further to insist on a jury mast apparatus being employed, when there is a caries of the cervical, or of the upper two or three dorsal vertebræ.

The alternative in the treatment of the latter class of cases is confinement to bed in the recumbent posture, with the extension apparatus as used in hip disease, fixed at the head of the bed, the weight of the patient's body constituting the counter extending force.

During the two years which have elapsed since Dr. Sayre gave his first demonstration in this country, much has been written on the subject by surgeons whose opinions are worthy of acceptance. It would be unfair in any statement of the present condition of thought upon the subject, to ignore reference to those who have fairly tried Dr. Sayre's plan, and have spoken in favour of it ; or on the other hand, to conceal the opinions of those who think indifferently of it. Mr. Barwell claims to have been the first English surgeon who tried the system, and he speaks highly in favour of it. Mr. Berkeley Hill, in a communication to the Clinical Society, on February 9th, 1879 ; Mr. Golding Bird, in a clinical lecture reported in the British Medical Journal for September 21st, 1878, in which he speaks from an experience of forty cases and Mr. Christopher Heath, also in a clinical lecture in the same Journal for May 25th, 1878, testify to the value of Sayre's treatment. At the Bath Meeting of the Association in 1878, Mr. Wheelhouse, of Leeds, in the address on surgery,

spoke thus of Sayre's plan of treatment: "That it is efficient in cure of many grievous cases will be admitted by all;" and he especially advocates it, in the earlier stages, remarking, as does Dr. Sayre himself, that not much good is to be expected in the later. At the same meeting, Dr. Macnaughton Jones, of Cork, gave an account of fifty cases, which had been most successfully treated by him. These favourable opinions, together with those of Mr. G. C. Cole, who followed Dr. Sayre's practice for six months at New York; of Mr. R. W. Parker, who has had great experience of it at the East London Hospital for Children; Dr. McLeod, of Glasgow, and of the following eminent London surgeons—Mr. Howard Marsh, Mr. Richard Davy, and Mr. Edward Owen—are no slight testimony to its value. But while all these gentlemen are strenuous advocates of Sayre's plan, we must not shut our eyes to the fact that there are some surgeons, whose experience and knowledge of the treatment of spinal diseases entitle them to be heard, either still refuse to admit the advantage of it, or who think that it is attended with risk, and that the cure of spinal curvatures may be effected in other and simpler ways. The principle of suspension is alleged to be dangerous, and although I have never myself seen any serious results follow from its use, I must say that patients, especially young children, are often very much alarmed at the time when they are first elevated, so that the tips of their toes alone rest on the ground, and that I have seen them almost at the point of fainting while the jacket was being applied. I was, a few weeks ago, at the Royal Orthopædic Hospital, in Oxford Street, London, and went round the wards in which were numerous cases of spinal curvature. To my surprise not a single patient was wearing a plaster of Paris jacket, and I was informed by the house surgeon

that neither Sayre's, Walker's, nor Fisher's jackets were employed except in very rare instances, and then only for out-patients who came from a long distance. The old fashioned cumbrous apparatus with leather back splints, with shoulder supports, and cog-wheels to compress the spine in this direction and the other, are still in use, and Dr. Sayre's spirited denunciations of such apparatus as "worthy of the best days of the Inquisition," and as rivals of the thumb screw, the rack, and the scavenger's daughter, might never have been uttered. I could not help thinking that some of the patients who had been a long while under treatment (one girl two, and one four years) by mechanical supports, or by rest in bed, would have had at least as good a chance of recovery, had the treatment by suspension of the plaster jacket been adopted in these cases. I am happy to say it is not so at the Birmingham Orthopædic Hospital, as the accompanying tables of cases treated at that Hospital, compiled for me by Mr. E. L. Freer, will prove.

Dr. Dick narrated at a meeting of the Medical Society of London, on November 25, 1878, a case in which a patient died in 10 minutes under extension, but I am not aware of any other fatal case, and doubtless had there been any such cases, they would have been reported in the Medical Journals.

To obviate this difficulty and danger, Dr. T. I. Walker of Peterborough advocated, in the Lancet for July 7, 1877, the use of a gutta percha case open at the front and laced up by bands, and in another paper read at the Bath meeting of the association, demonstrated a novel method of applying the plaster jacket in the recumbent posture; the advantages which he claimed for it being "avoidance of pain and terror to the patient, and absence of any risk of fainting," while at the same time it secures "the fixing

of the diseased bones in the most favourable position for obtaining a case with a minimum of deformity," and with freedom from the serious dangers and inconveniences of suspension. The gutta percha cases have been in general use for many years, and Mr. W. Adams, whose experience on this subject is probably greater than that of any living English Surgeon, asserts that he has used them for 25 years, but for all that they have ceased to be popular. My own experience tells me that gutta percha is not a good material for this purpose: that it loses its shape with the heat of the body and then ceases to be an efficient support, and that it is altogether inferior to the poro-plastic material invented by Mr. Cocking, and which has recently been extensively used for the making of spinal supports by Mr. Ernst. The chief advocate of the poro-plastic jacket is Mr. F. R. Fisher, surgeon to the National Orthopædic Hospital.

To this part of my subject I will return; but as Dr. Walker has asserted a new principle in the treatment of cases of spinal curvature, viz., that of the plaster case, applied in a special manner and *without* extension, it is only fair to give a brief account of his method of practice, and of the merits which he claims for it.

With regard to the plaster jacket, as applied to patients while in the recumbent posture, Dr. Walker declares "*that the diseased bones are at least as perfectly relieved from pressure, the muscles are as completely relaxed, and the deformity is as much diminished when the patient lies flat on the bed, as when he is suspended.*" He uses a closely fitting under shirt like that recommended by Sayre, but instead of applying long plastic bandages to encircle the trunk, he uses them in strips like a many-tailed bandage, the ends of the bandage being folded across the front of the body, so that there is "a strong wide rib down the

front, which is the point at which it should be strongest to resist the tendency of the spine to curve forward." As plaster of Paris when mixed with water alone sets too quickly, Dr. Walker uses the following proportions, viz., 1 lb. of freshly baked plaster, 1 oz. of mucilage of gum acacia, and 8 oz. water.

Dr. Walker thus summarises the results of his practice in his paper in the British Medical Journal for March 1st, 1879:

1. The main object of the treatment of angular curvature of the spine should be the maintenance of the affected bones and joints in a state of absolute rest, and that in the position most favourable for the cure of the disease without deformity.

2. This position is found when the patient is placed comfortably in a recumbent position.

3. By the application of a plaster of Paris jacket, as recommended by Sayre, the bones may be fixed in this position so as to retain it when the patient rises and moves about.

4. The only way in which such a jacket can be applied, with the patient recumbent, is by the method which I have demonstrated.

5. This method depends for its practical facility on the application of the many-tailed bandage and the use of plaster of Paris mixed as I have directed.

6. The adoption of the recumbent posture dispenses with the inconvenience and serious risks of suspension, while all the advantages of Sayre's method are secured for the patient at a minimum of trouble to the surgeon.

Dr. Walker uses a special trough, made by Matthew's of Carey Street, for moistening his bandages.

Dr. Miller, of Dundee, in the British Medical Journal, of November 8th, 1879, has suggested a modification of

the mode of charging the many-tailed bandage, which Dr. Walker himself regards as an improvement, and which I, also having tried it, find to be very simple and handy. It enables the plaster to be applied without the admixture of gum to delay the setting; it makes a stronger case, and the application of it does not occupy more than five minutes—a much shorter space of time than would be required by Sayre's or Walker's method.

It is thus applied :—"The patient having put on a thin closely fitting woollen shirt is laid on his back in bed, or on a table covered with a folded blanket, a waterproof under him, and his arms extended at right angles to his body. The requisite depth of jacket is marked on the bed by any appropriate means, such as pins inserted in the waterproof or blanket, two on each side, one opposite the axilla, and another opposite a point about an inch below the crest of the ilium. The patient is now made to sit, and after doing so, must be careful not to change his place on the bed, in order that when he again lies down he may resume exactly his former situation. The length of bandage having been ascertained, which is requisite to encircle the body and overlap in front to the extent of four or five inches, pieces of bandage cut to this length are laid down in succession across the bed, each piece overlapping the preceding by two thirds of its breadth, as Dr. Walker directs, until a sufficient number are laid down to give the required depth of jacket. The first and the last piece laid down should, however, be about a third of their breadth beyond the marks, and should be then folded in, as otherwise the jacket at its upper and lower edges would be only two-fold. The ends of the bandages are now fastened together by being fixed on each side between two slips of wood, which are clapsed by three American clothes pins. The

slips of wood should be about fourteen inches long, one inch broad, and three-sixteenths of an inch thick, and the wood should be left in its rough state on one side, in order to grip the bandages.

Everything being now ready, a thin mixture of plaster is prepared by mixing two pounds in forty ounces of water, and this is then poured on a flat tray, broad enough to accommodate the depth of the jacket. One of the layers of bandages is now drawn slowly through the plaster on the tray twice or thrice, care being taken that it is thoroughly saturated by turning first one side and then the other down, which having been properly done, it is laid aside in any convenient place. The other layer of bandages having been treated in the same manner, is laid on the bed behind the patient, being carefully placed on the spot previously marked, and the layer which was first dipped then laid upon it. By placing them in this order, the first dipped, and therefore nearest setting, will be first applied to the patient. The patient is now laid back carefully on the bandages, the arms extended as before, and, the slips of wood having been detached from the upper layer, each bandage in succession is brought round and overlapped in front. The slips of wood holding the ends of the bandages firmly between them, having prevented the saturation of these portions with fluid, an assistant, while they are being crossed in front, pours on with a spoon some of the fluid plaster from the tray. The second layer is put on in the same way, pieces of tin being interposed where thought desirable. As much as may be necessary of the remaining liquid plaster is now smeared over the surface of the jacket, and smoothed with the hand as it sets."

While giving every credit to Dr. Walker for the ingenuity of his plan of treatment, and admitting to

the fullest extent the advantage of his method of applying the plaster case, especially as amended by Dr. Miller in certain cases, as when the disease is in the cervical or even high up in the dorsal region, or when the little patients are very weak, sensitive or nervous, I must say that the omission of suspension is, to my thinking, a great disadvantage. I have had experience of upwards of 100 cases treated after Sayre's plan, and I have been so satisfied with it that I have not thought well in my own practice to give it up for Dr. Walker's plan. I asked my late very competent and industrious house surgeon, Mr. Jordan Lloyd, to apply Walker's cases to some of my patients to see how they would suit, and he informs me that he put on more than a dozen "Walker's" while at the Queen's Hospital; but that he "does not like them so well as Sayre's." "I applied," says Mr. Lloyd, "between 50 and 60 of Sayre's jackets and I do not think I was once dissatisfied or disappointed with the apparatus."

"Comparing Sayre's and Walker's plans, I think that the former possesses most of the advantages claimed for the latter, with that, to my mind indispensable, and, with care, absolutely safe, accessory—suspension. In all my cases I have only once had to credit suspension with either risk, trouble or anxiety, and that one amounted to a mere nothing, as the patient vomited during suspension; with this exception I have never had to blame suspension. I should have no hesitation in suspending any patient by means of head and shoulder straps, wherever the caries may be situated. In cases where the disease is high up, I suspend principally from the shoulders, employing the head gear only to lessen slightly the deformity. Where the disease is low down it is quite safe and proper to trust principally to head suspension. Experience has taught me that with Walker's apparatus you have not the time for

deliberation and manipulation which individual cases require, and that even by following out his precise instructions and using his particular apparatus, you are often unable to complete the apparatus before the plaster has set."

One of the most successful attempts to overcome some of the imaginary, if not real, difficulties of Sayre's treatment, is that introduced by Mr. F. R. Fisher,* whose memoir on the treatment of Potts' disease, or angular deformity of the spine, is worthy of a careful perusal. In a letter to me, Mr. Fisher says, "I have great faith in the use of suspension, and am not one of those who have discarded it from a fear of its ill effects. I believe that many of the accidents that have occurred during suspension and application of the plaster jacket have arisen from the bandages being too lightly applied and thus interfering with respiration. The plaster jacket I never use now, as I much prefer the poro-plastic." Mr. Fisher's reasons for his preference for the poro-plastic jacket over the plaster of Paris are, "greater facility of application, greater strength and durability, lightness, no risk of failure of the material, capability of removal to examine seat of disease, and more convenient arrangement of head piece."

The mode in which the poro-plastic jacket is applied is thus described by him: "A soft vest is put on as in Sayre's method, but no pads are used; the patient is then suspended and wrapped around with cotton wool or wet cloths to protect him from the heated material; in the meantime the jacket is softened by placing it in a chamber of air heated to a temperature of 180° Fahr., or if the necessary apparatus for this process is not available, immersing the jacket in boiling water answers all practical

* "Essays on the Treatment of Deformities of the Body." London: J. & A. Churchill. 1879.

purposes. In from two to three minutes it is rendered perfectly soft and pliant, and it is at once wrapped round the patient's body, moulded with the hand where necessary, and fixed by a bandage coiled round it from below upwards; this part of the process must be done as quickly as possible, as the felt becomes rigid in about the same time that it takes to soften. So soon as the jacket has become quite firm the patient is released from suspension, the bandage is then gradually removed, and the jacket fastened by the straps and lace. Should any failure occur in the first application, the jacket may be again heated and re-applied, as the softening process can be repeated any number of times without injury to the material." It should be worn for two years after firm consolidation of the spine has been obtained.

I have no personal experience of Mr. Fisher's poro-plastic jackets, but I am disposed to think favourably of them in cases of rotato-lateral curvature. They allow of patients taking exercise more freely, of their developing their muscles by various gymnastic games, and of the use of bathing and ablution. All these points are of the greatest utility in lateral curvature, though they are comparatively of secondary consideration in the more grave disease of the spine, which leads to angular curvature.

In the latter disease complete rest of the diseased bones is the desideratum, and that is to my mind, best effected by the application of one of Sayre's jackets while the patient is in a state of suspension.

Appendix, No. 1.

Mr. E. L. Freer, assistant surgeon to the Birmingham Orthopædic Hospital, has very kindly, and at considerable trouble, prepared for me a tabulated account of the cases treated by Sayre's plaster jacket and extension at that institution during past two years, which I should have been happy to publish in extenso, only it would occupy too much space. I may, however, summarise his results thus: 57 cases in all.

Lateral curvature.—29 cases; 5 males, and 24 females. Four cured, 13 improved, 7 under treatment, 2 discontinued the treatment owing to organic disease, 3 lost sight of.

Angular curvature.—28 cases; 15 males, 13 females. Seven cured, 11 improved, 4 under treatment, 6 lost sight of.

Appendix, No. 2.

Having asked Mr. Ashton Salt, the well-known surgical mechanist of this town, for his opinion of the respective merits of the plaster of Paris and the poro-plastic jacket, he has been good enough to furnish me with the following statement, which seems to me to bear ample testimony to the general superiority of the plaster jacket, while at the same time it points out the circumstances which appear to him to render the poroplastic jacket in some cases preferable. It is also gratifying to hear a surgical instrument maker of Mr. Salt's repute state that he has "almost wholly abandoned" the use of spinal supports. "Having had the good fortune to witness several of Dr. Sayre's demonstrations of his method of applying plaster of Paris jackets for spinal curvatures, I was so much impressed with the advantages of his treatment, that I immediately proceeded to practise it in every suitable case where the patient's medical attendant sanctioned

such procedure, with the result of obtaining greater success than could have been expected to attend the use of even very carefully designed spinal supports, the construction of which, I may say, by way of emphasis to this statement, I have almost wholly abandoned, except in special cases, and under direct surgical instruction. I have never known any evil results to accompany or follow the use of the plaster jacket, but have often experienced considerable difficulty in applying it to a fractious child, who is generally greatly terrified by the indispensable preliminary of suspension.



Weston's Tripod Self-sustaining Pulley Blocks for Applying Suspension.

"The 'Weston's Pulley Blocks' afford a ready means of exactly regulating the amount of suspension as well as of instantly freeing the patient.

"A very convenient and simple mode of adjusting the relative lengths of the head and axilla supports used in suspension has been devised by Mr. Ernst. In this contrivance the length of either support may be reduced by simply drawing on a cord which "binds" automatically wherever placed by the action of the patient's weight, thus saving much trouble and loss of time in the arrangement of the ordinary straps and buckles. The axilla supports are kept well extended so as to avoid pinching, by being suspended from the ends of two short curved bars hanging transversely from the outermost notches of the usual cross bar, instead of being fastened directly to the latter, so as to collapse or exert painful compression.

"Among adults and adolescents many patients are found, especially young ladies in the higher classes of society, who cannot be persuaded to consent to the application of a plaster jacket, chiefly on account of its interference with habits of personal cleanliness; for such the poro-plastic jacket is an admirable alternative, and is especially suitable to cases where a "jury mast" is required, as this admits of being much more easily adapted to the felt than to the plaster corset. All appliances of this kind ought to be made capable of separating from the jacket, by a simple joint behind the neck, so that they may be removed during sleep when they are no longer serviceable; also it is frequently desirable to furnish them with an elongating screw of short traverse, whereby the exact amount of support given to the head may be readily adjusted.

"The poro-plastic jackets should always be softened by dry heat, as water hot enough to render them sufficiently

plastic is painful to the hands. A small dish containing water should, however, be placed on the floor of the heater, whose evaporation will prevent scorching of the material. The temperature required to thoroughly soften the jackets varies from 160° to 180° Fahr., and the time occupied in the process is three or four minutes, which also suffices for them to regain their rigidity, so that the movements of the operator must be rapid.

"The most convenient method of preventing the heated jacket from causing discomfort to the patient is by drawing over the shoulders three of Sayre's knitted vests, one over the other; these adapt themselves more exactly to the figure than ordinary clothing, and should be retained for subsequent wear underneath the jacket."

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